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*Indian Standard*  
**SAFETY CODE FOR PLANT RAILWAYS**  
**PART I LAYOUT**

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## SAFETY CODE FOR PLANT RAILWAYS

## PART I LAYOUT

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# *Indian Standard*

## SAFETY CODE FOR PLANT RAILWAYS

### PART I LAYOUT

#### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 6 September 1976, after the draft finalized by the Industrial Safety Advisory Committee had been approved by the Executive Committee.

**0.2** In the preparation of this standard, assistance has been derived from the following publications which is gratefully acknowledged:

Model code of safety regulations for industrial establishments for the guidance of governments and industry, 1969. International Labour Organization.

Accident prevention manual for industrial operations. Ed 6. 1969. National Safety Council, USA.

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#### 1. SCOPE

**1.1** This standard lays down safe practices in the layout (clearances, track, loading and unloading) for plant railways.

#### 2. TERMINOLOGY

**2.0** For the purpose of this standard the following terms shall apply.

**2.1 Plant Railway** — A railway which is operated by the owners or operators of a plant, and includes both permanent way and rolling stock.

**2.2 Permanent Ways and Tracks** — Permanent ways having a line of rails fixed to ties or sleepers and laid to gauge, providing tracks for rolling stock of plant railways, and includes the necessary points and crossings, turntables, and sidings.

**2.3 Rolling Stock** — Locomotives and goods wagons including tank wagons.

**2.4 Locomotive** — A self-propelled engine mounted on a truck designed to run on gauged tracks, and used for hauling other rolling stock in the transportation of materials.

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**2.5 Bogie Wagon** — A roofed goods bogie wagon.

**2.6 Open Wagon (Gondola)** — A goods bogie wagon designed to run on broad gauge or metre gauge track, and has raised sides and ends with no roof at the top. Unloading is done through the floor of the wagon.

**2.7 Open Wagon (Hopper)** — A goods bogie wagon designed to run on broad gauge or metre gauge track, and has raised sides and ends. Unloading is done through chutes provided at the sides.

**2.8 Open Wagon (BFR and BRH)** — A goods bogie wagon without sides and ends.

**2.9 Tank Wagon** — A goods bogie wagon on which a tank for carrying the load is permanently mounted on the underframe.

### **3. CLEARANCES**

**3.1** In so far as possible, plant railway hazards should be eliminated in the design of a new plant. Horizontal and vertical track clearances are primary considerations and the same shall be provided in accordance with the 'Indian Railways — Schedule of Dimensions' for the respective gauges in consultation with the concerned railways. It is recommended that in this and all other phases of track construction, Indian Railways standards be adopted provided Municipal, State or Central regulations do not conflict.

**3.2** Where platforms, building entrances, or structures are located along curved track, additional clearance shall be allowed on both sides of the curve for lateral movement of rolling stocks at centre and at ends as specified in the 'Indian Railways — Schedule of Dimensions'.

**3.3** Additional track clearance shall be allowed also when door and windows are installed in adjacent buildings.

**3.4** Wherever clearances are not specified particularly for the man riding on the side of a wagon, warning signs should be placed at suitable points. Side or overhead tell-tales sometimes are installed to give positive warning of approach to structures with close clearance or the driver should stop dead at such points and then proceed.

**3.5** Standard clearances may not give enough protection where tracks pass doorways or corners of buildings, or other places where workers may walk directly into tracks in front of moving wagons. These locations may be safeguarded with fixed railings that force pedestrians to detour a short distance before stepping into the track. If a barrier railing is impractical, hinged bars or gates swinging horizontally are effective. Still another means is convex mirror located at the intersection of the passageway and the track at a 45° angle, in which approach railway equipment can be seen before the intersection is reached.



**3.6** Various methods are used to warn pedestrians at railway crossings inside plants. Blinking lights and gongs are more effective than signs. Where railway traffic is heavy, it can be safeguarded effectively by gates equipped with red lights and by watchman, who should be provided with a whistle and a hand signal lamp/flag.

**3.7** The visibility of gates is increased by painting them with alternate yellow and black stripes at an angle of about 45 degrees.

**3.8** Another means of protection is automatic bell warning system.

**3.9** Plant yards where plant or railway personnel may be required to shunt wagon or perform other work at night should be adequately illuminated by high intensity, high pole lights so arranged as to cast as few shadows as possible.

#### **4. TRACK**

**4.1** All track fittings, and structure should be installed in accordance with Indian railway specifications for the service required.

**4.2** It is essentially for safety that the track of whatever gauge be substantial and level. The rail bed should have a stable formation and be well drained through the use of gravel or crushed stone, with ties embedded and packed in ballast. To facilitate maintenance and inspection, the top surface of the ties should be left uncovered.

**4.3** The size of ties varies according to different gauge sizes. Specifications used by railway are a good guide in purchasing ties for a plant railway.

**4.4** The size of rails varies according to the various gauges, the loads encountered and the speeds. The principal factor in determining rail size is the type of the rolling stock.

**4.5** Regardless of the size of the rails, they should be securely fastened to the ties by rail-tie fastening. If electric locomotives are used, joints should be electrically-bonded.

**4.6** Rails and fittings should be inspected periodically and maintained and conform to standard specifications. Serious accidents may be caused if defects are permitted to go unremedied.

**4.7** Tracks shall not be laid sharper than the maximum degree of curvature prescribed in the 'Indian Railways — Schedule of Dimensions' for the various gauges. Generally, it is desirable to provide flat degree of curvatures for safer and better operation of rolling stocks in the plant yards.

**4.8** Tracks should have a flat gradient at loading points. Workmen have been killed when wagons roll down the slopes and trap them. If it is necessary to stop wagon on gradients, brakes should be set tightly and

wagon stoppers, rail clamps or rail slings used. However, for long loading points a gradient of 1:1 000 is recommended for proper drainage.

**4.9** Derailing switches are needed at the bottom of steep slopes and where loop lines slope and connect to main lines. Derailing switches also should be installed on the approach to permanent loading and unloading areas, where located within or outside of building. Where such areas are on tracks open at both ends, derailing switches should be placed beyond both ends of the loading and unloading area. Derailing switches should not be located in hard-paved area, as this type of surface will defeat the purpose of the derailing switch.

**4.10** Trestles should have a footwalk not less than 1.5 m wide, measured from the nearest rail. Railing should be 1 m high and tie boards 15 cm high. If footpaths are necessary on both sides of the track, crosspaths should connect them. Trestles shall be designed and built to carry anticipated loads and withstand vibration and shock.

**4.11** Openings at ground level for conveyors and similar equipment used to unload wagons should be provided with covers that are kept in place when equipment is not in use to prevent persons from falling into them.

**4.12** Hoppers or trackside bins into which material is dumped should also be covered with suitably spaced steel bars which will prevent anyone from falling or being carried through the openings. It may also be necessary to cover pathways that are under trestles in order to protect those using them from falling materials.

**4.13** When tracks end in dead end, a buffer should be installed.

**4.14** Point and crossing lever swinging parallel to the rails is safest. Point and crossing lamps are needed if tracks are to be used at night.

## **5. LOADING AND UNLOADING**

**5.1** Tracks at loading and unloading areas warrant special attention because numerous accidents occur when loads are loaded into and unloaded out of wagons. When clearance between the door of the wagon and the unloading platform is wide, large gang planks are required. If the loading is considerably above or below the level of wagon openings, loading and unloading is more hazardous.

**5.2** The dock should be wide enough to provide temporary storage area without interference with truck movements. Portable gang planks shall be securely anchored.

# INDIAN STANDARDS

ON

## INDUSTRIAL SAFETY

IS:

- 3786-1966 Method for computation of frequency and severity rates for industrial injuries and classification of industrial accidents
- 8089-1976 Code of safe practice for layout of outside facilities in an industrial plant
- 8091-1976 Code of safe practice for industrial plant layout
- 8095-1976 Accident prevention tags
- 8218 ( Part I )-1976 Safety code for plant railways: Part I Layout

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